

Translator's Note: This is a poorly written Japanese report. We suspect it was translated rather poorly from English into Japanese.

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(Total of 9 pages)

Compressed Coated Tablet Press

Explanation of the Figures

Figure 1 is a plane view of the principal operating component of a machine based on this invention and shows its interrelationships. Figure 1a is a reduced frontal view of the entire machine. Figure 2 is an expanded plane view of the die mold punches that are installed in a circle inside the die mold pocket wheel. Figure 3 shows the various operational stages of the punch which are selected in machine operation. Figure 4 is a partial vertical cross-sectional view of the machine and shows the relationships of the various parts. Figure 5 is a plane view of the air regulation manifold. Figure 6 is an enlarged view of the receiving nozzle.

Detailed Description of the Invention

This invention relates to a compressed, coated tablet press.

It has been well known for 75 to 100 years that tablet preparations are enclosed by a powder and that the powder is compressed under increased pressure to surround and coat the perimeter of the tablet.

It has also been known for many years that this coating is performed by the following apparatus. That is, individually made tablets are used and large volumes of tablets are manufactured using a machine that operates continuously.

* Translator's Note: Transliteration may result in an incorrect spelling of the name.

A patent up to the present relating to compressed tablets is U.S. Patent No. 207013 (13 August 1878) of Carter [phonetic]. Examples of machines for tablet coating include U.S. Patent No. 568488 (29 September 1896) of Royce [phonetic] and U.S. Patent No. 1246571 (4 December 1917) of Stokes [phonetic]. A newer example is U.S. Patent No. 2700938 (10 February 1955) of Wolf [phonetic].

One objective of this invention is to make a coating device or compressed coating of better powder properties than can be mass-produced by various known machines. In order to achieve this objective, it is a device that has advantages that are clearly superior to those of any known machines. In particular, one objective of this invention is to construct a machine to prepare coatings of desired quantities on both sides of a tablet in which the tablet is placed in the center inside the coating.

Another objective is to make a device that can be adapted for core tablets of various sizes and shapes and to make a device that is reliable in actual operation in cases in which tablets cannot be made without a core.

Another objective is to prevent molding of solid tablets in which a core is not present.

Another objective is to make a machine with which materials are reliably introduced under pressure into the bottom charge after the acceptance die pocket has moved vertically to the position in which the top charge is received. A regulation device for the vertical position of the bottom charge is installed so that reliable installation of the core is permitted.

The numerous other objectives of this invention and their characteristics will become clear from what is described below.

Core tablet feeding and selection

The hopper 20 for the core tablet is positioned above the oscillating feed screen 22 and a plate is attached to it by 24. When the tablet passes through the feed device, the tablet is turned upside down and dust and dirt are cleaned from its two sides. The tablet is introduced into the disk 26,

this disk is rotated by the continuously rotating shaft 28 and the shaft 28 drives the drum 30 (Figure 4). The disk 28 is installed above it.

The drum 30 is subjected to gentle oscillation by the oscillation unit 32, which has the roller 38 that is connected to the drum. In addition, in 38, the tablet, which is very slightly inclined, is turned toward the perimeter to the top of the disk, which is rotating at a variable speed, and is fed outwards. At the aforementioned perimeter, the core selection ring or fixing ring 40 rotates in the opposite direction to the feed plate 28, or, if desired, in the same direction.

The selection ring 40 is set on the chain wheel or annular cogwheel 42, the aforementioned chain wheel is installed in the perimeter of the stator column 44 and the drum shaft 28 passes through this stator column. The chain wheel or annular cogwheel 42 passes through the chain from the die mold head and is driven as will be described subsequently. The cogwheel 46, which engages with the cogwheel 48, is installed on the idler shaft 50 and drives the vacuum head as will be described subsequently.

The holding ring 60 is installed on the perimeter of the plate 28 and on the selection ring 40. It is desirable that it be a transparent element so that it can be observed that the operating wheels are feeding the tablet toward the selection ring 40. The ring 60 is installed so that it rotates together with the ring gear 42 and the selection ring 40. Further, it can be separated at a sufficient distance from the plate 26 on the upper side and the core can pass between the two of them. They can approach each other only to the extent that overlapping is avoided. The ring 60 is also provided with a series of holes 61 at a common diameter. These holes 61, which are adjacent to the inside part of the machine, extend the pickup nozzle into the ring 40 and raise the core tablet.

The spider ring 82 is installed on the stator column 44. It extends to the outside beyond the plate 26 and forms the stator ring-shaped stand 64. The core that has been selected is mounted on this stand after the disk 26 has been removed. A cut 68 is provided at a precisely stipulated distance on the inner side of the selection ring 40 and one or several

tablet cores are received from the large number of cores that reach it from the oscillating plate 28. The cut forms an angle in the grating direction with the disk 28 facing the radius. For this reason, there is a tendency for the tablet to deviate from the disk. When the stator ring 64 is pulled the core is drawn into the cut 68.

The selected core 70 shown in Figure 1 is positioned at the center of the holes 61 of the ring 60. There is a smaller cut on the backs of these holes. They play the role of carrying away crushed core or other particle-shaped substances that may have been carried into the machine. These materials pass through the passageway 74 immediately below the stator plate 62 and emerge from the machine. Accordingly, they pass through the holes in the chain wheel 42.

Thus, the first unit of this apparatus is comprised of an oscillating hopper, which supplies the core to the oscillating plate 26, and the screen 22. The oscillating plate feeds the core, which is positioned parallel to it, to the ring 48, which is in reverse rotation or forward rotation. The ring 40 is provided with the holes 68 and these holes are positioned immediately below the holes 61 inside the ring 60, which rotates the selected core together with the ring 40.

Core receipt and installation

In the second stage action, the selected cores are received, and, in the third stage, which includes conveying these cores to the third stage apparatus, the cores are installed and coated. The second stage action is performed by the idler guide wheel or gearless wheels 80 and 82. The aforementioned guide wheel is established adjacent to the chain wheel 42. There is a vacuum tube 90, which is installed between the idle wheels 80 and 82, which are attached to the shafts 84 and 86, so that they can rotate inside the bearing 92. The gear wheel 94 and the gear wheel 96 that engage with it operate together. The vacuum manifold that is installed at the top of the vacuum tube 90 is rotated. This is shown in Figure 1. The fact that the manifold 100 is affixed on the top of the vacuum tube 90 is shown in Figure 1. This manifold 100 is comprised of the fixing component 102 at the top of the apparatus and of the rotation component 104 at the bottom of

the device. The bottom part of the device is provided with a series of holes 106 and each hole is connected to the tube 108. Their objective is discussed subsequently.

As shown in figure 5, the fixing component 102 is a semicircular shell that forms a vacuum chamber on the left side of the manifold 100. This shell is installed so that it can be adjusted very slightly in the radius direction and the circumferential direction and is connected to the inside of the vacuum tube 90. This vacuum tube is joined together with a depressurization source which is called an ordinary vacuum tube. The fixing component is supported by the bracket 112.

The external pressure tube 114 is connected to another stator manifold 116 on the right side of the manifold 100 (Figure 5) to form the pressure chamber 116. For this reason, the holes 106 inside the rotating plate 104 selectively become under vacuum when they pass through the bottom of the semicircular vacuum chamber 102, and, further, individually assume a pressure greater than atmospheric pressure when they pass through the bottom of the chamber 118. A suitable vacuum source at a characteristic pressure, the vacuum tube 90 and the external pressure tube 114 are connected. The chain 120 supports large numbers of core transfer nozzle support bodies 122 that project through the perimeters of the idler gears 80 and 82 from the chain in the radial direction.

Each of these core transfer combinations is hollow and is connected with the rotating tube wheel 104, which operates synchronously with the outside diameters of the chain wheels 80 and 82. Each transfer combination has the short metal tip tubes and is connected to the tube 108. The tube 108 is flexible and it is desirable that, as much as possible, it be made of plastic.

In addition, the chain 120, as shown in Figure 4, engages with the chain wheel 42, and, similarly, engages with the chain wheel or the wheel-shaped cogwheel on the head of the press coating die stand to be described subsequently. The core transfer combination is comprised of the hollow body 126. This has the small nozzle 128, which projects toward the bottom. This comes into contact with the core tablet and plays the role of

receiving it, the core tablet being securely affixed to the bottom of the nozzle 128 by the vacuum inside the core transfer device.

The small metal index piece 130 is positioned at the perimeter of the nozzle and the core is raised to the end of the nozzle 128. When this occurs, it is desirable that the core be placed mechanically in the center (Figure 6). There is an elevated part 132 on the part 126 of the core transfer combination and the two attachment rods 134 pass through them and penetrate into the interior of the chain wheel 120 and descend. These pins connect the pins between the rings and form a part of the chain. The core transfer combination 122 is installed so that the top of the rod 134 moves vertically. The spring 136 on the bottom of the rod 134 normally holds the core transfer combination in an elevated position. The cams 142 and 144 are installed on the machine frame 140 and actively apply pressure on the core transfer combination at characteristic times within the circuit or create an elevated configuration.

In the operations of the second stage with this device, the chain wheel combination is rotated synchronously with the selection ring 40 and the aforementioned ring is positioned so that ring 60 and the hole 61 are congruent. For this reason, the cam 142, which acts above the roller 150, moves the index strip 128 into the hole 61 and the core at the top part of the nozzle 128 is accepted in the vacuum inside the chamber 102 where it can be held.

Next, the core is moved and rotated to an installation position relative to the press die mold stand to be described subsequently by the chain and the core transfer combination.

Core coating action

The mechanism for core tablet coating is shown in Figure 1, the left side of Figure 4, Figure 2 and Figure 3. The principal component of this part of the machine is, of course, the die mold stand head or the rotating wheel 160. This rotating die mold head has a gear component on the outer side. It engages with the chain wheel 120 and operates synchronously with the chain operation.

The die mold head is driven by a motor that is connected to the chain wheel 162. The die mold stand 160 which holds the sprocket does not have teeth. It drives the chain 120 that is guided by the chain wheels 80 and 82 and the chain 120 drives the chain wheel 42. This is provided with a large number of isolated holes 164 and 166 on the perimeter. The hole 162 is provided for the purpose of receiving the die mold 168 and the die 168 has the die hole 170. When these holes pass over the chain 120 through the perimeter of the chain wheel gear of the die head 160, it assumes a distance such that it is congruent with the core transfer nozzle 128.

The bottom die mold head 172 and the apex die mold head 174 are installed on the same shaft as the die mold stand 160. The bottom die mold head 172 is provided with large numbers of holes 176 which are set at intervals on the perimeter (Figure 2). Each hole has a punch 178. These punches have the operating head 180 and the punch tip 182. Similarly, the upper die mold head has a large number of holes 186 set at intervals on its perimeter. Each hole is provided with a punch 188 and the punch has an operating head 190 and a punch tip 192.

The vertical motion of each bottom punch 178 is regulated by the friction plunger lined with the spring 196 which is made of nylon or a similar material (Figure 4). For this reason, any desired vertical motion of the punch inside the hole 176 must be obtained by active operation of the punch.

The vertical motion of the punch inside the top and bottom die mold heads is performed by the action of cams. As shown in Figure 2, the elevating cam 200, which is shown in the left upper part of the figure, has the guard 202. This guard engages with the bottom side of the operating end 190 and raises the end part inside the cam passageway 204 (Figure 4). Consequently, the punch is supported for most of its circumferential movement at a fixed height on the die mold stand 160. As shown in Figure 2, at the right end, the punch descends, meets the guard 206 on the cam 208 and the aforementioned lowering cam lowers the punch. Consequently, it moves essentially in the tangential direction and comes into contact with the pressure roller 210. Continuing into the grounding with the

pressure roller, the punch again meets the guard 202 on the cam 200 and moves to an elevated position.

For the purpose of regulation of the bottom punch and for the purpose of starting at the left end in Figure 2, the ejection cam 220, which has the regulation plug 222, moves the punch 178 toward the apex position, where it releases the finished tablet 224. The pull down cam 226 immediately lowers the punch 178 to the level ring 228 against the friction of the plunger 194. The weight regulation cam 230, which can be regulated by the nut 232, makes precise measurements of the coating material for the initial charge. The bellow cam 234 assumes a shape that reaches the punch head or end 180 without relation to regulation of the cam 230. Consequently, the punch rides on the cam or leveler 236 which positions the core and the aforementioned leveler can be adjusted by the gnarled [phonetic] nut 238. The cam which positions the core moves inside the bottom charge in which the space in which it is reliably positioned is precisely adjusted.

Next, the punch rides to the second weight regulation cam 240. After it leaves the cam, it is held in its position by the nylon plug 194 until it is moved essentially in a tangential relationship to the bottom pressure roller 250 by the pressure of the top punch. The plunger passes through the space of the pressure roller. At the same time that it leaves it, the punch meets the ejector cam 220 and again elevates it to the release position. Each punch inside the bottom die mold head is, for convenience sake, given a number from 1 to 33 as indicated in Figure 3. Figure 3 shows the various operating stages. A mechanism is established for feeding the coating material, to be described subsequently, to the die inside the die stand 160 in powdered form. It has the form of the first feeder shoe 260 and supports the hopper 262 on it. The granular substance is fed into the first pocket 264 and the additional pockets 266 and 268 are usually established. There is a plate 270 just anterior of the first feed pocket 264. This plate cuts off and separates the finished tablet and transports it to the discharge shoot 272, which passes through the hopper 264 and the oscillating dust removal screen 276. After the die holes on a suitable equalizing plate 278 (Figure 2) are filled, the apex is cleaned and the measurement feeding tape 280 is installed in

the back of the machine as shown in Figure 1 to level it. It has large numbers of holes 282 of a long shape at intervals in the circumferential direction. A second feeding shoe 284 that has a suitable popper 286 provides the granular feeding material to the feeding pocket 288. The relative positions of the feeding plate 280 and the die tape 160 become superimposed in the die pocket 170 when the cable 280 moves the storage site 282 synchronously with the die table.

The shape of the holes 282 is such that the holes are above the holes 170 throughout the curve movement period of the two die table wheels. Thus, the powder drops from the apex table 280 to the die table 160. The scraping plate or cleaning plate 290 levels the excess quantity of apex charge on the core tablet. The composite cogwheel 285, which is removed, engages with the bottom punch cylinder 178 and rotates the table 280 and the table 160 together.

Operation

In the operation of this apparatus, the core that is to be coated is introduced into the guard 20 and is fed to the oscillating plate 29 by the oscillating screen 22. This oscillating plate transports the core toward the outside in the ring 40. Here, it is received by the groove 68 which is installed in a predetermined position in the radius direction. At the same time as the wheel is rotated in the direction of the arrow, the chain 120 also rotates the core transfer combination while bringing it into congruence with the hole 61 of the ring 60 and supporting it inside the passageway that is above it. In a suitable position relative to the machine, the core transfer combination is moved downwards by bringing the roller 150 into contact with cam 142 and the index strip 130, which projects on the receiving nozzle 128, by suction that is transmitted from the vacuum chamber through the tube 108, and, at the same time, the core is positioned. Next, the perimeter of the machine is moved and the core that has been selected is brought into a position that is on the inside circumference of the die mold plate or table 160.

During this time, the die holes 170 inside the table 160 are filled in the first feed shoe 280. As shown in Figure 2, the bottom die punches 1, 2, 3, 4

and 5 receive and next elevate the charged, and, finally, it is made even by the scraping plate 278. For this reason, the predetermined charge which was measured accurately can initially be introduced into the die holes.

Next, the bottom punches are lowered by the cam 234. They are then moved to a predetermined height or are raised to the core release position by the cam 236, which can make adjustments. This prevents the core from becoming inclined or slipping from the center after it has been installed. What is desired is to eliminate the case of the charge together with the core that has been positioned being subjected to increased pressure as will be described subsequently so that it does not descend inside the die mold pocket. The bottom charges are supported by the nylon plunger 194 so that they do not descend.

This operating stage is shown by plungers 8 through 12. Next, as shown in Figure 2, the core transfer nozzle 128 is gradually lowered inside the die holes. The reason for this is that the cam 144 pushes the roller 150 downwards in opposition to the spring 138 and the entire transfer frame 122, including the small transfer nozzle 128, that supports the vacuum chamber 126 and the tablet core is lowered.

At this point in the operation, the vacuum is cut off and the tube is opened to the atmosphere. Thus, the reason that it is desirable in many cases for the core to be pushed into and retained in the initial granular charge inside the die holes which are markedly separated downwards from the surface of the die table is that the core is pressed into the bottom charge and positions it. This installation operation is performed as shown by charges 11, 12, 13, 14 and 15 in Figure 2.

During introduction of the core under pressure into the initial granular charge, the bottom punches are securely adjusted in the vertical position by the cam 236, which can effect adjustment, and the aforementioned cam positions the punches so that they can receive the pressure of the core transfer nozzle.

In the second stage operation, the measurement feeding table 280 measures out and

introduces a certain quantity of granular coating material inside the die hole apex in positions 19, 20, 21, 22 and 23. The plunger is moved upwards, and when the scraping plate or wiping plate 290 comes to a position on the cam 240 that is very carefully adjusted, the apex of the die is cleaned. Now, the charges are positioned below, above and around the core. The top punch is compressed by moving it downwards on the came 206, and, at the same time that the punch approaches the pressure rollers 210 and 250, the leveling rod 244 is lowered, the pressure roller exerts the required amount of pressure on the entire charge and the coating around the core tablet is solidified. The cam 202 rapidly moves the top punch upwards. Next, the ejection cam 220 raises the core up to the surface of the die table 160 where it is removed by the plate 270 and this operation is repeated.

After the cores have been positioned inside the die of the die table in the pressure range inside the idler manifold 116 and at a point before other cores are received, they are individually discharged into the tubes 108. This is for wiping away the dust on the index strip 130, to clean up pulverized pieces and partial pieces from the nozzle 128 and to prepare for another receipt. When the core is packed inside the nozzle, the increased pressure inside the external pressure tube is reflected onto the die frame 300 and acts on the microswitch 302. Next, the solenoid break clutch 304 is operated and the machine is immediately stopped. This safety adjustment can be supplemented by the filler index piece 308 (Figure 1). This operates the same regulation switch 308 that is connected to the solenoid break clutch.

If for some reason, the core is not introduced, and, for some reason, there is no core that is released from the nozzle 128 by pressure, the core, when it is not received from the ring 40, is suctioned and flows through nozzle 128 and tube 108 which do not receive cores. This suctioning extracts the granular bottom charge in the die of die table 160. Consequently, when the holes reach the pressure roller, only the top charge is discovered inside the die holes.

Only a predetermined pressure movement exists in the roller. Therefore, the quantity is insufficient to compress a single determined charge

to a stable quantity. The fact that, at the release point, this loose granular charge is pulverized in tatters and that this powder is removed in the oscillating screen 276 assures the fact that there is no core in the released and completed tablet.

Claim

A core tablet coating apparatus which forms a compressed granular coating which has a feeding table and die table that work on essentially parallel shafts having depressions on their perimeters and that are set at an interval from each other on their perimeters, a sprocket guide pulley that is positioned so that it has a perimeter that is essentially tangential with each table and a sprocket chain that engages with each table on the chain, that has a mechanism whereby the pulley and the table operate at the same circumferential velocity, the sprocket chain operates between the perimeter of the aforementioned sprocket pulley and the aforementioned feeding table and die table, large numbers of vacuum transfer machines work on the aforementioned sprockets which are set at an interval from each other, that is congruent with the depressed region of the aforementioned receiving table and the aforementioned die table and that raises and lowers the aforementioned mechanism when it approaches and is congruent with each table and that has a mechanism and that has a vacuum adjustment mechanism inside the aforementioned transfer mechanism that receives the core from the aforementioned receiving table and concludes the vacuum action.

Supplementary Notes

1. A combination as described in the Claim which as a first feed site for granular substances that is positioned relative to the die table in front of the core apparatus and a second feed site that is positioned relative to the aforementioned die table for the purpose of placing a granular charge that has been determined precisely on the apex of the installed core.

2. A combination as described in Note 1 in which the second feed site is partially overlaid on the perimeter of the die table and which has holes that receive the granular substance after it has been received and are suited to placing it in the die holes

of the die table when a second table is rotated at the same time.

3. A combination as described in the Claim which has a central disk that is set parallel to the core feed table and that is inclined downwards from the center toward the periphery, a mechanism that rotates the aforementioned disk in one direction, a ring that has large numbers of reception pores that open toward the aforementioned ring perimeter and that are on its inside perimeter, a mechanism that rotates the aforementioned ring relative to the aforementioned disk, holes that are that are set at intervals on the circumference so that they are congruent with the reception mechanism and a ring that operates synchronously with the aforementioned reception mechanism.

4. A combination as described in Note 3 that forms a tangent line with the feed disk in a depression on the inside circumference of the rotation ring and that forms a square that is positioned so that it approaches it.

5. A combination as described in Note 3 in which a cap ring is overlaid on the aforementioned reception ring and that stops overlaying of the core.

6. A combination as described in Note 3 that is equipped with a mechanism that oscillates the aforementioned feed disk and that moves the core that is placed on the disk toward the periphery.

7. A combination as described in the Claim in which the core transfer mechanism which contains a mechanism that mounts the aforementioned body, which has a hollow passageway, on a vertical shaft and which moves it vertically relative to it, an elastic mechanism that pushes the aforementioned body upwards, and a cam mechanism that is adjacent to the perimeters of the aforementioned core feed table and the aforementioned die table, that moves the aforementioned body downwards and that performs the respective reception and discharge actions.

8. A combination as described in Note 7 in which the aforementioned body has a core feed nozzle that projects downwards from it and which has an index strip in which three or more gaps are

established on the perimeter of the aforementioned core and which is suited to receiving the core.

9. A combination as described in Note 7 in which there is a component in which vacuum manifolds pass through a series of openings and tubes and are connected to each core transfer body, there is a mechanism that connects the aforementioned vacuum manifolds to a pressure source that is at atmospheric pressure, which moves relative to the aforementioned table and in which reception [provisional translation as an incorrect character seems to have been used: Translator] and discharge of the aforementioned core feed table and die table [occurs], the aforementioned tubes are connected to a vacuum and the aforementioned tubes are cut off from the vacuum in air. [TRANSLATOR's NOTE: we are assuming that this patent was translated from English. If so, this section may have been poorly translated into Japanese as it makes poor sense.]

10. A combination as described in Note 9 in which a regulation mechanism is mounted on a rotating column that passes downwards through the aforementioned chain wheel.

11. A combination as described in Note 9 in which an air source greater than atmospheric pressure is established, a mechanism that operates together with the aforementioned manifold is provided and the aforementioned tube is positioned so that it is connected with the pressure source that is between the release position and the reception position of the core.

12. A combination as described in the Claim which as a mechanism in which large numbers of punches are paired and are set inside the rotating head above and below the die table, in which the paired punches are fitted to be congruent with the die holes inside the die table and that regulates the height of the aforementioned punches in the entire rotating passageway of the die head.

13. An improvement in the apex particle feed mechanism which, in the compression coating mechanism of the mold which uses a die pocket rotating head, auxiliary apex and bottom punches, a bottom layer particle feed and an apex layer particle feed, has a mechanism that fills the apex particle

feed channels that are determined inside the holes of the aforementioned table when the apex layer particle determination table (which table is pocketed by holes that are positioned so that they overlie the die pockets when the two components are rotated) holes, which are positioned so that they move on a shaft parallel to the head and overlie at one point on the perimeter and a mechanism that holds the holds the channels inside the holes of the aforementioned table until the channels cross over the die head.

14. An improvement in the core supply mechanism which, in the compression coating mechanism of the mold which uses a die pocket rotating head, auxiliary apex and bottom punches, a bottom layer particle feed and an apex layer particle feed, has a receiving rotating table that rotates in the vicinity of the compression table, a moving connecting component that comes into contact with the perimeters of the two tables, and a mechanism that is on the aforementioned connecting component that selects a core from the aforementioned core feed table and that presses the core into the bottom channel that is determined in the die pocket of the compression table during movement of two tables. [TRANSLATOR's NOTE: The use of the word "determined" in this sentence and elsewhere further suggests a possibly poor translation from English. The Japanese word means "determine" in the sense of "measure" and does not to our knowledge have the nuance of "determine" as it used in the intended sense it has in English in this sentence.]

15. An apparatus as described in Note 14 in which a mechanism is established that guides the aforementioned connecting component into a fixed passageway between the tables.

16. An apparatus as described in Note 14 in which the aforementioned connecting component is driven by the aforementioned tables.

17. An apparatus as described in Note 14 which has a mechanism on the aforementioned transfer combination that selectively combines with a large number of core transfer combinations or a core on the connecting component that is superimposed on the table and that is moving through a passageway and transfers the core from one table to another table.

18. An apparatus as described in Note 17 in which the reception table has a rotating central disk and notches that are on a portion of the perimeter of the aforementioned disk and in which several gaps are established and has a paddle wheel that receives the core and that positions the core relative to the passageway of the connecting component and a suction nozzle on each reception body that is connected to an air source of a pressure less than atmospheric pressure and that is fitted to make the connecting components congruent with the aforementioned notches when it is moved over the perimeter of the table.

19. An apparatus as described in Note 18 in which a stator mechanism is present on the aforementioned notch and forms a support passageway for the core that has been selected.

20. An improvement in the core feed mechanism which contains, in the compression coating mechanism of the mold which uses a die pocket rotating head, auxiliary apex and bottom punches, a bottom layer particle feed and an apex layer particle feed, and contains a reception rotating table that rotates in the vicinity of the compression table, a moving connecting component that comes into contact at the perimeter with both tables, a large number of suction nozzles on the aforementioned connection component that selects a core from the aforementioned core supply table that is on the aforementioned connection component and that presses the core into the bottom channel that is determined inside the die pocket of the compression table during movement of the two tables, a mechanism that supplies to the aforementioned nozzle in a predetermined part in the path of the aforementioned nozzle, a mechanism that supplies air under pressure to the aforementioned nozzle in the course between the discharge and reception parts of the passageway [TRANSLATOR's NOTE: "passageway" is an educated guess for a clearly meaningless misprint] and a mechanism that responds to extreme pressures inside the aforementioned nozzle.

21. A mechanism as described in Note 20 in which a mechanism is established in which one tube is connected to the pressure source and that faces the pressure in the nozzle in a part of the course of the nozzle, in which a pressure response mechanism

reflects the pressure that is joined with the air in the nozzles and that is increased by the blocked nozzle, that responds to the increased pressure and that stops the mechanism.

22. A core feed mechanism that has, in the compression coating mechanism of the mold which uses a die pocket rotating head, auxiliary apex and bottom punches, a bottom layer particle feed and an apex layer particle feed, a mechanism that supplies the core that is to be coated, a connecting component that is connected with the two tables at their perimeters and moves, a mechanism which selects a core from the aforementioned supply and that can move vertically on the aforementioned connecting component (which mechanism is a component that can move downwards in the bottom pocket on the surface of the die pocket and which introduces the core under pressure into the bottom channel surface which is determines the core) and a mechanism that has a pressure manifold that joins together the tubes that are joined with each nozzle and each tube in the a part of the course of the connecting component with the pressure source and that cleans each nozzle after descent of the nozzles.

23. An apparatus as described in Note 22 in which the pressure in the tube that is reflected and increased in the blocked nozzle operates the pressure response mechanism and the pressure response mechanism that stops the mechanism works together with each tube in a portion of its advance.

24. An apparatus as described in Note 22 in which a mechanism, when there is no positioned core, stops the mechanism that responds to the core and a responding index strip that works together with it is installed and which is positioned so that it cleans the region immediately below the aforementioned nozzle after movement,

25. An improved core feed mechanism which has, in the compression coating mechanism of the mold which uses a die pocket rotating head, auxiliary apex and bottom punches, a bottom layer particle feed and an apex layer particle feed, a reception rotating feed table that rotates close to the compression table, a moving connecting component that comes into peripheral contact with the two tables, a mechanism that is above the

aforementioned connecting component, that selects a core from the aforementioned core supply table and that introduces the core under pressure into a bottom charge that is determined by the die pocket of the compression table while the two tables are moving and concentric rotating external rings that are superimposed on a portion of the perimeter of a rotating central disk aforementioned disk [sic] (the aforementioned rings having large numbers of notches positioned at intervals, receiving the core relative to the passageway of the aforementioned connecting components and positioning them).

26. An operational method for a continuously operating automatic tablet coating machine that has a continuous mechanism which includes placing a certain quantity of coating material that is inside the aforementioned pocket into a bottom punch, cleaning the die wheel and determining the quantity of coating material, lowering the bottom punch and the measured material into a wheel, positioning the core on the material that has been lowered, maintaining the coating material that has been measured at the lowered height, positioning a second quantity of coating material in the first quantity and the core, and next compressing the two quantities of material on the perimeter of the core and which supplies a disk that has pockets set at intervals, top and bottom die punches that operate together with the aforementioned die pocket, that are set at an interval and that form a pair and the core to the aforementioned pocket, a mechanism that supplies the coating material to the aforementioned pocket and a mechanism that adjusts the relationship between the aforementioned punches and the aforementioned pockets.

Fig. 1

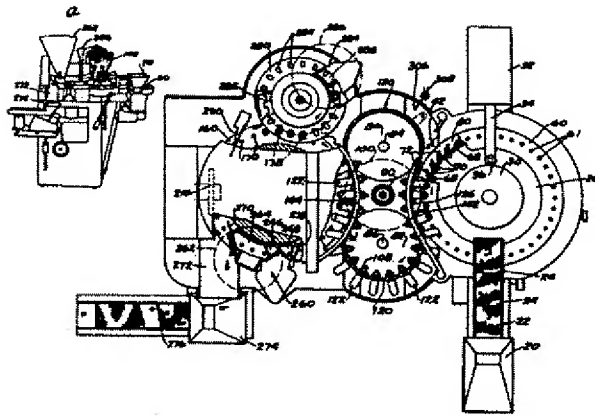


Fig. 2

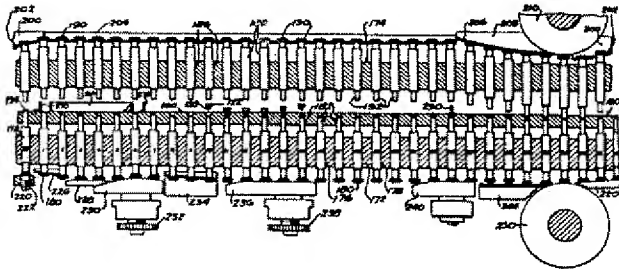


Fig. 3



Fig. 4

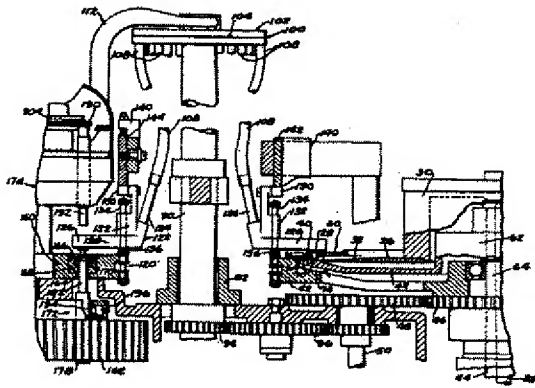


Fig. 5

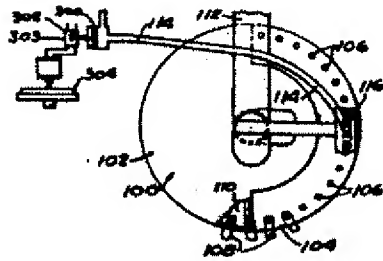


Fig. 6



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圧 縮 被 覆 錠 剤 プ レ ス

図 面 の 略 解

第1図は本発明による機械の主作動部分の平面図であつてそれらの相互関係を示す。第1図aは機械全体の縮小正面図である。第2図はダイス型ポケット車内に円形に配置されているダイス型パンチの平面展開である。第3図は機械作働におけるある選ばれたパンチの色々の作働段階を示す。第4図は機械の部分的垂直断面図であつて各部分の関係を示す。第5図は空気調節マニホールドの平面図である。第6図は取上げノズルの拡大図である。

発明の詳細なる説明

本発明は圧縮被覆錠剤プレスに関するものである。

錠剤形医薬が錠剤を或量の粉で囲んで、加圧下で粉を圧縮し錠剤の周囲を包囲し被覆することは少く共75乃至100年間公知である。

この被覆が次のような装置によつて行われる事もまた数年前から公知である。即ち先ず個々に作られた錠剤を用いて、次に連続作働機械を用い大量に錠剤を造り出すことである。

圧縮された錠剤に関するこれまでの特許としてはカーター氏の米国特許第207013号(1878年8月13日)がある。錠剤被覆用装置の例としてはロイスの米国特許第568488号(1896年9月29日)ストークスの米国特許第1246571号(1917年12月4日)がある。さらに新しいものとしてはウルフの米国特許第2700938号(1955年2月10日)がある。

本発明の一つの目的は既知のいずれの機械よりも大量生産される粉状物質の改良された被覆装置または圧縮被覆を作ることであり、この目的達成のため既知装置のいずれのものよりも明らかに優れた利点を持つものである。特に本発明の一つの

目的は一つのコア錠剤を被覆内の中心におき錠剤の両側上に所望量の被覆を作る機械を作ることである。

さらに他の目的は色々の大きさおよび形状のコア錠剤に適合出来る装置を作り、錠剤はコア無しでは作ることの出来ない所の実際上作働確実な装置を作るにある。

本発明の一つの目的はコアが中に含まれなければ固形錠剤の型成が防止され安全装置と基本構造とを造るにある。

本発明の他の目的はコアを取り上げダイスポケットが上方チャージを受ける位置まで垂直に動かされた後材料の下方チャージ内に確実に圧入する機械を作るにある。下方チャージの垂直位置用調整装置はコアのこの確実な設置を許すように設けられる。

本発明の他の多数の目的ならびに特徴は以下記載する所により明らかとなる。

コア錠剤送りと選択

コア錠剤用ホッパー20が振動送りスクリーン22上に位置されており、これは24で段がついており錠剤が送り装置を通過する時錠剤をひっくり返して錠剤の両側から塵埃を清掃する。錠剤は送り円盤26内に入り、この円盤は不斷に回転している軸28によつて回転され、軸28はドラム30を駆動し(第4図)この上にデスク26が設けてある。

ドラム30は、アーム34とドラムに接触しているローラー36を持つている振動単位32によつて軽い振動を受け、また38においては僅かに傾斜して錠剤を周辺に向つてこの可変速度で回転している円盤上を外方に送り出し、上記周辺ではコア選択環または定置環40が送り板28と反対方向またはもし望むならば同一方向に回転している。

選択環40は鎖車または環状歯車42上に設置され上記鎖車は静止柱44の周囲に設けられ、この静止柱をドラム軸28が貫通している。鎖車または環状歯車42は後記するようにダイス型頭部から鎖を通して駆動される。歯車48と噛合っている歯車46が遊び軸50上に設置されており、後述するように真空頭部を駆動する。

保持リング68が板28の周囲上ならびに選択環40上に設置されており、これは透明体として運転車が選択環40に向つて錠剤が送られているのを観察出来るようにすることが望まれる。リング60はリングギヤ42と選択環40と一緒に回転するように設けられ、かつ板28からは上方に充分な距離離れていてコアが二者の間を通過出来るが、重なりを避けるに充分なだけ接近している。リング60はまた共通直径上に一連の孔61を備える。機械の内方部分に隣接して、これらの孔61はピックアップノズルをリング40内に達せしめコア錠剤を上昇させる。

静止柱44上にはスパイダーリング82が設けられこれは板28を越えて外方に延び静止環状台84を作り、この台上に選ばれたコアが円盤28を去つた後乗る。選択環40は内側に規則正しく距てられた切欠き68を備えており、振動板28からこれに到着する多量のコアから一つまたは多数の錠剤コアを受ける。切欠きは半径に対し円板28に切線方向に角度をなし、それゆえ円板からの錠剤をすくう傾向がある。この静止リング84を引くとコアを切欠き68内に引き入れる。

第1図に示す選ばれたコア70はリング60の孔61の中心に位置され、これらの孔の背後には一層小さい切欠き72があり、これは破碎されたコアまたは機内に運び込まれる恐れある他の粒状物質を運び去る役目をなす。この材料は静止板82の直下の通路74を通過して機械を出て、そこで鎖車42内の孔を通過する。

かくしてこの装置の第一単位はコアを振動板28に供給する振動ホッパーとスクリーン22から成り振動板は平らな位置にあるコアを逆回転または前方回転しているリング48に送り、リング40は孔88を備えこの孔は選ばれたコアをリング40と一緒に回転しているリング60内の孔61の直下に位置させる。

コア取上げおよび設置

第二段の作用は選ばれたコアの取上げ、およびこれらのコアを第三段の装置に運搬することを含み第三段ではコアは設置され被覆される。この第

二段作用は二つの遊び案内車または歯無し車80, 82によつて行われ、上記案内車は鎖車42と隣接して設置され、それぞれ軸84, 86上に取付けられる遊び車80と82間には軸受92内に回転出来るように設置された真空管90があり、歯車94とこれと噛合っている歯車96と一緒に作動し、これで真空管90の頂部に設置された真空マニホールドを回転させこれは第1図に略示される。このマニホールド100は真空管90の頂部上に固定される事、第1図に示する通りである。このマニホールド100はこの装置の頂部上の固定部分102ならびにこの装置の底部上の回転部分104から成る。この装置の底部分は一連の孔106を備え、各孔は管108に連結されておりその目的は後述する。

固定部分102は第5図に示すようにマニホールド100の左側に真空室を形成している半円形のシエルである。このシエルは半径方向と円周方向に僅かに調節出来るように設置され真空管90の内部に連結され、この真空管は普通真空と呼ばれる減圧源と一緒になつてゐる。固定部分はブラケット112で支持される。

外圧管114がマニホールド100(第5図)の右側の他の静止マニホールド116に連がれ、圧力室116を作る。それゆえ回転板104内の孔105は半円形真空室102の下方を通過する時選択的に真空となり、かつ室116の下方を通過する時は個々に大気圧以上の圧力となる。特有の圧力における適当な空気源を設けて真空管90と外圧管114を連絡する。鎖120が遊び車80, 82の周囲を通り鎖から半径方向に突出している多数のコア移送ノズル支持体122を支持する。

これ等のコア移送組合せの各々は中空であつて鎖車80, 82の外径と同期的に運動している回転管輪104に連結される。各移送組合せは短い金属先管124を持ち、これは管108と連結し、管108は可撓性であつて、なるべくプラスチック製が望ましい。

鎖120はまた第4図に示すように鎖車42と噛合いかつ同様に後述するプレス被覆ダイス台頭部上の鎖車または輪状歯車と噛合っている。コア移送組合せは中空体部分126から成り、これは小さい下方に突出したノズル128を持ちこれはコア錠剤と接触する取上げの役目をなし、コア移送装置内の真空によつてノズル128の底部に確実に附着させる。

小さい金属指片130をノズルの周囲に位置させてコアがノズル128の端部まで上つて来た時

コアを機械的に中心におくようにすることが望まれる(第6図)コア移送組合せの部分128上には立上り部分132があり、これを通して二つの取付棒134が鎖車120内に貫通下降する。これ等のピンはリンク間のピンを連結するものとして鎖の部分形成する。コア移送組合せ122は棒134上を上下動するように配置され、従つてこれは下降してコア錠剤を取上げて設着したこのような二点間通路内に上げられることも出来る。棒134の底部上のばね136は正常にはコア移送組合せを揚げ位置に保持する。機械棒140上には、カム142, 144が設置されており回路内の特有の時期においてコア移送組合せを積極的に圧下し、また上昇させる形状をなす。

この装置の第二段階の作動においては、鎖車組合せは選取環40と同期的に回転し、上記環はリング60の孔61と一致するように位置され、そのためローラー150上に作用するカム142は指片128を孔61内に動かし室102内の真空でノズル128の端部上のコアを取上げ、これを保持させることが出来る。

コアは次に鎖とコア移送組合せによつて後述するプレス被覆ダイス型台に相対的な設着位置まで動き回される。

コア被覆作用

第1図および4図左側および第2図、3図においてコア錠剤被覆用機構が示してある。機械のこの部分の主要部材は勿論ダイス型台頭部または回転車160である。この回転しているダイス型台頭部は外側に歯部分を持ち鎖車120と噛合い鎖作動と同期的に運動する。

ダイス型台頭部は歯車162に連結されたモーターによつて駆動される。スプロケットを持つたダイス型台160は歯なし鎖車80, 82によつて案内された鎖120を駆動し鎖120は鎖車42を駆動する。これは多数の円周上に離隔された孔164, 166を備える。孔166はダイス型168を受けるため設けられ、ダイス168は次いでダイス孔170を持つている。これ等の孔はダイス台頭部160の鎖車歯の周囲を通る鎖120上を通る時コア移送ノズル128と一致するように距離を取つてある。

ダイス型台160と同じ軸上に底部ダイス型頭部172と頂部ダイス型頭部174が設けてある。底部ダイス型頭部172は多数の円周上に間隔をおいた孔176を備え(第2図)各孔はパンチ178を支持し、このパンチは作動頭部190とパンチ先端192を持つ同様に上方ダイス型頭部を円周上に間隔を置いた

多数の孔186を備え、各孔はパンチ188を備えパンチは作動頭部190とパンチ先端192を持つ。

各底部パンチ178はその垂直運動において、ナイロン製または同じような材料製(第4図)であり、ばね196で裏打された摩擦ブランジヤー194によつて調節され、それゆえ孔176内の下方パンチの任意垂直運動はパンチの積極的作働によつて得られなければならない。

上方および下方ダイス型頭部内のパンチの垂直運動はカム作用によつて行われる。第2図に示すように図の左上方に示す揚げカム200はつば202を持つており、このつばは作動端190の下側と噛合い端部をカム通路204(第4図)内に持ち上げ従つてパンチはダイス型台160上一定高さにおいてそれ等の円周運動の大部分に対して支持される。第2図に示すように右端ではパンチは引き下しカム208上のつば206と出合い上記引下しカムはパンチを下げ、従つてそれ等は圧接ロール210と実質上切縁方向に動いて接触する。圧接ロールと接地に続いて、パンチは再びカム200上のつば202と出合い上昇位置に動く。

下方パンチの調整のためと第2図左端における始動のため調整ブラッグ222を持つたエゼクションカム220がパンチ178を頂部位置まで動かしここでそれは仕上つた錠剤224を放出する。直に引き下しカム226はパンチ178をブランジヤー194の摩擦に抗してレベルリング228まで下降させる。ナット232で調整出来る重さ調整カム230は被覆材料の最初のチャージ用の正確な測定をなす。ベルロカム234はカム230の調整とは無関係にパンチ頭部または端部180に到達する形状をしている。従つてパンチはコアを位置させるカムまたはレベラー236上に乗り上記レベラーはナールしたナット238によつて調整出来る。このコアを位置させるカムはコアが下方チャージ内に動かされてその中に確実に位置される間正確な調整が出来る。

パンチは次に第二重さ調整カム240まで乗て行きこのカムを去つた後で、上方パンチの圧力によつて底部圧接ロール250に実質上切縁関係に動かされるまでナイロンブラッグ194によつてその位置に保持される。パンチが圧接ロール間を通過しかつこれを去ると同時にパンチはエゼクターカム220と出合いこれは再び放出位置にこれ等を上昇させる。下方ダイス型頭部内の各パンチは第3図に就いて便宜上1から33まで番号を附けた。第3図は色々な作働段階を示すものでこれは後述する被覆材料を粒状でダイス台160内のダイスに送る

ための機構が設けられ、第一送りシユュー 260 の形状をしており、その上にホツパー 262 を支持しており、粒状物質を第一ポケット 264 内に送り込む追加ポケット 266, 268 が普通のように設けられる。第一送りポケット 264 の丁度前方には板 270 があつてこの板は仕上げられた錠剤を切離しそれ等をホツパー 274 ならびに振動除塵スクリーン 278 に通ずる排出シユート 272 に運ぶ。適当な均らし板 278 (第 2 図) はダイス孔が一杯になつた後でその頂部を掃除してこれを均らす第 1 図に示すように機械の後には測定送りテープ 280 が設けてあり、円周方向に隔てられた長い形状の孔 282 多数もつ。適当なボツパー 286 を持つた第二送りシユュー 284 は粒状被覆材料を送りポケット 288 に供給する。送り板 280 とダイステーブル 160 の相対位置はポケット貯蔵所 282 はケーブル 280 がダイステーブルと同期して動く時ダイスポケット 170 に重なるようにする。

孔 282 の形は孔は二つのダイステーブル車の曲線運動期間を通じて孔 170 上にあるようにする。かくして頂部テーブル 280 からダイステーブル 160 への粉を落す。掻き板または清掃板 290 はコア錠剤上の頂部チャージの過量を均らしかつ除去する合成歯車 285 は下方パンチ円筒 178 と噛合いテーブル 280 をテーブル 160 と一緒に回転させる。

作 動

この装置の作動においては、被覆さるべきコアはホツパー 20 内に入れられ振動スクリーン 22 によつて振動板 26 に送られ、この振動板はコアを外方に向つてリング 40 に運びこゝで溝 68 によつて取上げられ予定の半径方向の位置に配置される。車が矢の方向に回転すると同時に鎖 120 もまたコア移送組合せ 122 をリング 80 の孔 61 と一致し、かつこの上にある通路内に支持しながら回転する。機械に対し適当な位置において、コア移送組合せ 122 はローラー 150 がカム 142 に接触することによつて下向に動かされ取上ノズル 128 上の突出した指片 130 は管 108 を通る真空室 110 から伝えられる吸入によつて取上げられると同時にコアを位置させる。選ばれたコアは次に機械の周囲を動かされダイス型板またはテーブル 160 の内周上にある位置に持来される。

その間ダイステーブル 160 内のダイス孔 170 は第一送りシユュー 260 において充填される。第 2 図に示すように、下方ダイスパンチ 1, 2, 3, 4, 5 はチャージを受け取り、次に持ち上げられ最後に掻取 278 によつて平にされる。それゆゑ予定の

正確に測られたチャージがダイス孔内に最初に入ることが出来る。

次に下方パンチはカム 234 によつて下向に予定高さまで動かされまた調節出来るカム 236 によつてコア放ち位置まで持ち上げられる。この事はコアが設置された後中心から傾いたりまたは外れることを防止する。望ましい事はチャージは位置されたコアと共に後述するように加圧下の場合を除いてはダイス型ポケット内に下降されない事である。下方パンチはナイロンブランジャー 194 によつて落下しないように支持されている。

この作働段階はブランジャー 8 乃至 12 で示してある。次に第 2 図に示すようにコア移送ノズル 128 は漸次ダイス孔内に下降する。何故ならばカム 144 は、ばね 138 に逆つてローラー 150 を下向に押し真空室 128 ならびに錠剤コアを支持する小さい移送ノズル 128 を含むコア移送枠 122 全体を下降させるからである。

作働中この点において、真空は切断され管は大気に開かれる。かくしてコアはダイステーブルの表面より著しく下方に離れているダイス孔内の最初の粒状チャージ内に押されて残留させられる多くの場合望まれる事は、コアを底部チャージ内にプレスしてこれを位置させることである。第 2 図のブランジャー 11, 12, 13, 14, 15 で示すようにこの設置作動が行われた。

コアを最初の粒状チャージ中に圧入中、下方パンチは調節出来るカム 236 によつて垂直位置に確実に調節され上記カムはパンチをコア移送ノズルの圧力を受けるように位置させる。

第二段の作働においては、測定送りテーブル 280 がある量の粒状被覆材料を位置 19, 20, 21, 22, 23 においてダイス孔頂部内に測り入れ掻き板または拭い板 290 はブランジャーが上方に動かされカム 240 上の注意深く調整された位置まで来た時ダイスの頂部を清掃する。今やチャージはコアの下、上ならびに周囲に位置されるので、上方パンチがカム 208 上に下向に運動することによつて圧縮されチャージ全部はパンチが圧接ロール 210 250 に近づくと同時に均らし棒 244 が下降され圧接ロールは所要量の圧力を作用しコア錠剤の周囲の被覆を固化させる。カム 202 は上方パンチを急速に上向に動かし、次に投射カム 220 はダイステーブル 160 の表面までコアを持ち上げ、こゝで板 270 によつて取除かれこの作働は繰返えされる。

静止マニホルド 116 内の圧力区域はコアをダイステーブルのダイス内に位置させた後および別の

コアを取上げる前に一点において個々に管108内に排出される。これはこれは指片130の塵を払いノズル128から碎片または部片を清掃し他の取上げ準備をさせる。コアがノズル内に詰まつた場合には、外圧管114内の増加した圧力がダイヤフラム300上に反射されこれがマイクロスイッチ302に作働し、これは続いてソレノイドブレーキラッチ304を作働し機械を即時停止させる。この安全調整はフイーラ指片306(第1図)によって補うことが出来、これはソレノイドブレーキラッチに連結された同じような調節スイッチ308を作働する。

もしなにかの理由でコアが入れられてないとすると、圧力によつてノズル128から放出されるコアがなにかの理由でリング40から取上げられないならばコアを受けていない特殊ノズル128および管108を通る吸入流れがある。この吸込はダイステープル160のダイス内の粒状の下方チャージを引き出し、従つて孔が圧接ロールに到達した場合上方チャージだけがダイス孔内に見出される。

ロールには予定された確定した圧接運動だけが存在するゆゑ、単一の測定されたチャージを安定量に圧縮するにはその量が不充分である。放出点ではこの緩い粒のチャージはぼろぼろに碎かれた振動スクリーン276においてこの粉が除去されるこの事は放出した完成錠剤にはコアのないものはない事を保証する。

特 許 請 求 の 範 囲

円周上に凹所を持ち実質上平行軸上において作働しそれらの周囲には相互に隔てられている送りテーブルならびにダイステープル、各テーブルと実質上切線となる周囲を持つように位置されたスプロケット案内車、各テーブルと車上において円周で噛合つているスプロケット鎖を持ち、車とテーブルとは同じ円周速度で作働し、スプロケット鎖は上記スプロケット車の周囲と上記ダイステープルならびに送りテーブル間で作働し、多数の真空伝達機構が隔てられた上記スプロケット上で作働し上記取上げテーブルならびに上記ダイステープルの凹所と一致し、近づく各テーブルと一致する時上記機構を上下させる機構と上記取上げテーブルからコアを取上げ真空作用を終らせて上記コアを上記ダイステープル内に置かせる上記伝達機構内の真空調整機構とを持つ圧縮粒状被覆を形成されたコア錠剤被覆装置。

附 記

- 1 コア装置の前にダイステープルと相対的に位置された粒状物質用第一送り場所ならびに設置されたコアの頂部上に正確に測られた粒状チャージを置くため上記ダイステープルと相対的に位置された第二送り場所を持つ特許請求の範囲記載の組合せ。
- 2 第二送り場所はダイステープルの周囲の一部に重合し、粒状物質を取上げ点から受入れこれを二つのテーブルが同時に回転する時ダイステープルのダイス孔内に置くに適合した孔を持つた所の附記第1項記載の組合せ。
- 3 コア送りテーブルには、水平におかれかつ中心から外周に向つて下向に傾斜した中央円盤、上記円盤を一方向に回転する機構、上記輪周に向つて開きその内周上にある多数の取上げ孔を持つリング、上記デスクに相対的に上記リングを回転する機構、取上げ機構と一致するように円周上に間隔をおいて設けられた孔、上記取上げ機構と同期的に作働するリングとを持つた特許請求の範囲記載の組合せ。
- 4 回転リングの内周上の凹所に送りデスクと切線をなして近寄るように位置された角をなした切欠である附記3記載の組合せ。
- 5 キャンプリングは上記取り上げリングに重合しコアの重合を防止するようになる附記3記載の組合せ。
- 6 上記送りデスクを振動させデスク上におかれたコアを外周に向つて運動させる機構が備えてある附記3記載の組合せ。
- 7 コア移送機構はその中に真空通路を持つた一体上記一体を垂直軸上に載置しこれと相対的に垂直運動させる機構、上記一体を上方に押す弾性機構、上記コア送りテーブルならびに上記ダイステープルの周囲に隣接して位置し上記一体を下向に動かし、それぞれ取上げおよび排出作用を行わせるカム機構とを含む特許請求の範囲記載の組合せ。
- 8 上記一体はそれから下向に突出したコア移送ノズルを持ち上記ノズルの周囲に三つまたはそれ以上の間隔を置いたコアを受けるに適合した指片を持つている所の附記7記載の組合せ。
- 9 真空マニホールドは一連の開口と管を通してそれぞれ各コア移送体に連結され、上記真空マニホールドを大気圧以下の圧力源に連結する機構、上記テーブルと相対的に運動し上記コア送りテーブルとダイステープルの要り上げおよび排出

部分において、上記管を真空に連結しおよび上記管を真空から大気にそれぞれ切断する附記 7 記載の組合せ。

- 10 調節機構は上記鎖車間を下方に通る回転柱上に載せられている回転体を持つ附記 9 記載の組合せ。
- 11 大気圧より大きい空気源が設けられ、上記マニホールドと共働する機構が備えられ上記管をコアの放ち位置と取上げ位置の間の一点で圧力源と連結するように配置されている附記 9 記載の組合せ。
- 12 多数のパンチが対をなしてダイステーブルの上下に回転頭部に配置されており、各対のパンチはダイステーブル内のダイス孔と一致するに適合し、ダイス頭部の回転回路全体に上記パンチの高さを調節する機構を持つた特許請求範囲記載の組合せ。
- 13 ダイスポケット型回転頭部、その補助的頂部および底部パンチ、底部層粒子送り、および頂部層粒子送りを用いる型の圧縮被覆機械において、頭部に平行な軸上で作働し一つの円周点において重合するように位置された頂部層粒子測定テーブル（このテーブルは二つの部分が回転する時ダイスのポケットに重合するように位置された孔でもつて円周にポケットされている）孔がポケット頭部に近づく時上記テーブルの孔内に測定された頂部層粒子送りチャージを充たす機構、チャージをダイク頭部上を越えるまで上記テーブルの孔内にチャージを保持する機構とを持つた頂部層粒子送り機構における改良。
- 14 ダイスポケット回転圧縮テーブル、その補助頂部および底部パンチ、底部層粒子送り、頂部層粒子送りを利用する型の圧縮被覆機械において、圧縮テーブル近くで回転している取上げ回転送りテーブル、両テーブルと周囲で接触して運動している連続部材、上記連続部材上にあつて上記コア送りテーブルからコアを選択し両テーブルが運動中圧縮テーブルのダイスポケット内に測定された底部チャージ内にコアを圧印する機構を持つたコア供給機構における改良。
- 15 テーブル間の一定通路内に上記連続部材を案内する機構が設けてある附記 14 記載の装置。
- 16 上記連続部材は上記テーブルによつて駆動されている附記 14 記載の装置。
- 17 選択的にテーブルに重合する通路内を動いている連続部材上に多数のコア移送組合せとまたコアに組合つてコアを一つのテーブルから他の

テーブルへ移送する上記移送組合せ上の機構とを持つた附記 14 記載の装置。

- 18 取上げテーブルは回転中央デスク、上記デスクの周囲の一部の上であり多数の間隔を置いた切欠を持ちコアを受け連続部材の通路と相対的にコアを位置させる外輪、大気圧以下の圧力の空気源に連結され連続部材がテーブルの周囲上を動く時上記切欠と一致するに適合する各取上げ体上の吸入ノズルを持つ附記 17 記載の装置。
- 19 静止機構が上記切欠の下にあつて選択されたコア用の支持通路を形成する附記 18 記載の装置。
- 20 ダイスポケット型回転圧縮テーブル、その補助頂部パンチおよび底部パンチ、底部層粒子送り頂部層粒子送りを用いている型の圧縮被覆機械において、圧縮テーブル近くで回転している取上げ回転テーブル、両テーブルと周囲で接触して運動している連続部材、上記連続部材上にあつて上記コア供給テーブルからコアを選び両テーブルが運動中圧縮テーブルのダイスポケット内の測定された底部チャージ内にコアを圧印すべき機構であつて上記連続部材上の多数の吸入ノズル、上記ノズルの行程の予定部分中上記ノズルに吸入を供給する機構、それら通録の排出および取上げ部分間の行程の一部の間中上記ノズルに圧力下の空気を供給する機構、上記ノズル内の非常圧に反応して機械を停止する機構を含むコア送り機構における改良。
- 21 1本の管が圧力源に連結されておりノズルの行程の一部の中ノズルに圧力を向け、圧力応答機構が上記管と空気で一緒になり詰まつたノズルによつて増加された圧力を反射し、上記高められた圧力に反応して機械を停止する機構が設けてある附記 20 記載の装置。
- 22 ダイスポケット回転圧縮テーブル、その補助頂部および底部パンチ、底部層粒子送り、頂部層粒子送りを用いた型の圧縮被覆機械において、被覆さるべきコアを供給する機構、両テーブルと周囲で接触して運動する連続部材、上記供給からコアを選ぶ上記連続部材上の垂直に推動出来る機構（上記機構はダイスポケットの表面の下方ダイスポケット内に下方に可動であつてコアを測定された底部チャージ表面内に圧入するものである）各ノズルと一緒になつた管および連続部材の行程の一部中各管を圧力源と一緒にする圧力マニホールドとを持つたノズル下降後各

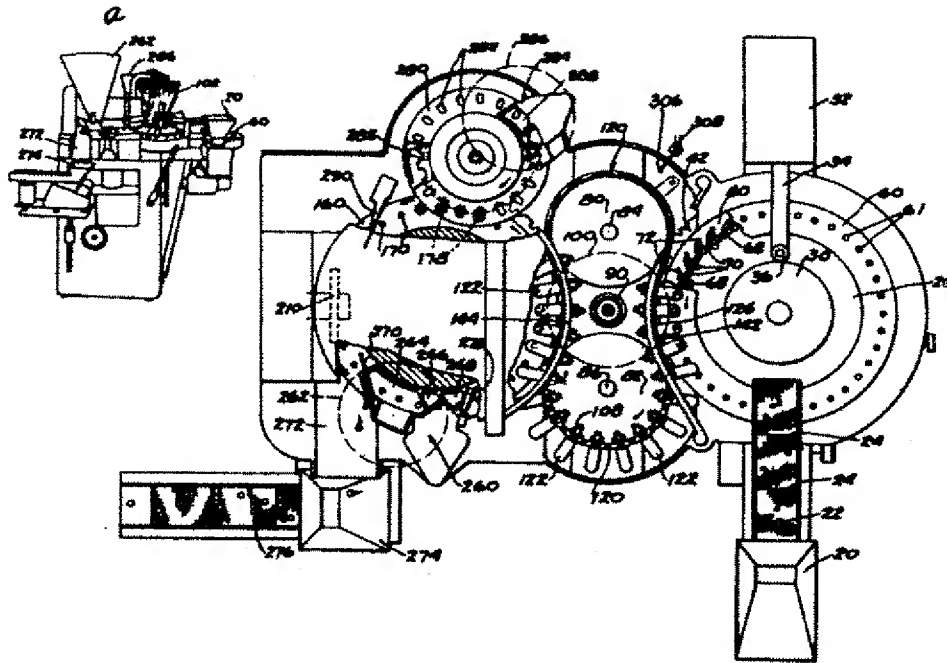
ノズルを清掃する機構とを持つたコア送り機構における改良。

- 23 詰まったノズルに反射して上昇された管内圧力は圧力応答機構を作働し機械を停止させる所の圧力応答機構がその進行の一部中各管と共働する附記22記載の装置。
- 24 位置されないコアがあるとこれに応答して機械を停止させる機構と共働する感応指片が設置運動後上記ノズルの直下の区域を掃除するように位置されている附記22記載の装置。
- 25 ダイスポケット型回転圧縮テーブル、その補助頂部および底部パンチ、底部粒子送り、頂部粒子送りをを用いた型の圧縮被覆機械において圧縮テーブル近く回転している取上げ回転送りテーブル、両テーブルと周接触して運動している連続部材、上記連続部材上にあつて上記コア供給テーブルからコアを選択し両テーブルが運動している間に圧縮テーブルのダイスポケット内に測定された底部チャージ内にコアを圧入する機構、回転している中央デスク上記デスクの周

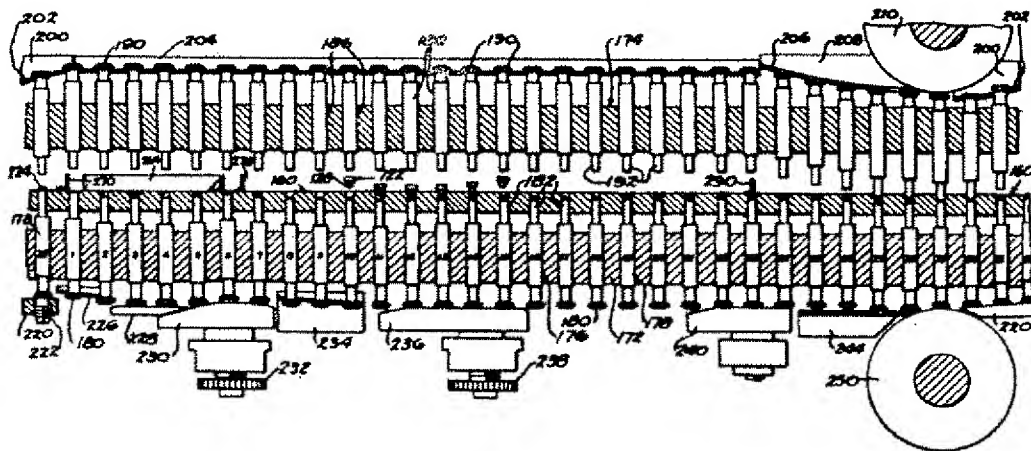
囲の一部上に重なつている同心回転外方リング（上記リングは間隔を置いた多数の切欠きを持ち上記連続部材の通路に相対的にコアを受けこれを位置させるリング）を持つたコア送り機構の改良。

- 26 上記ポケット内のある量の被覆材料を下方パンチ内に置き、ダイス車を清掃して被覆材料の量を測定し、下方パンチならびに測定された材料を車内に下降させ、コアを下降された材料上に位置させ、コアと測定された被覆材料を下降された高さに維持し、被覆材料の第二の量を第一の量ならびにコア内に置き、次いでコアの周囲の材料の二つの量を圧縮することを含み間隔を置いたポケットを持つたダイス、上記ダイスポケットと共働する間隔を置いた対をなした上方および下方ダイスパンチ、コアを上記ポケットに供給する連続機構、上記ポケットに被覆材料を供給する機構、上記パンチと上記ポケットとの関係を調整する機構とを持つた連続作働自動錠剤被覆機械作働方法。

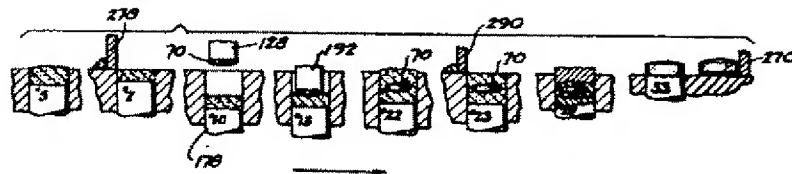
第1図



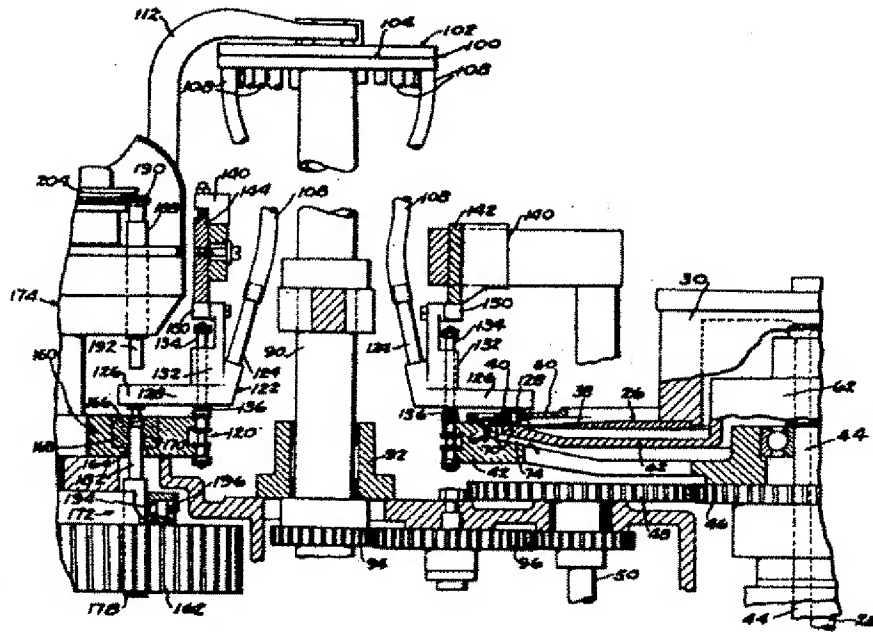
第2図



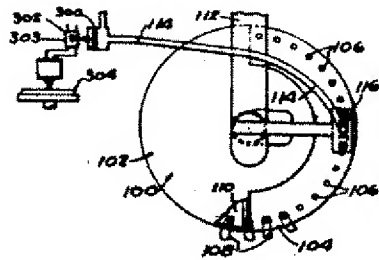
第3図



第4図



第5図



第6図

